इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 4910-12 (1981): Methods of test for tyre yarns, cords and tyre cord fabrics made from man-made fibres : Part 12I Sampling for tyre yarns, cords and tyre cord fabrics made from polyamide [TXD 1: Physical Methods of Tests]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 4910 (Part XII) - 1981

(Reaffirmed 2004)

Indian Standard

METHODS OF TEST FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM MAN-MADE FIBRES

PART XII SAMPLING FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM POLYAMIDE

UDC 677·46·061·43 : 677·011 : [620·113]

© *Copyright* 1981

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 6·00

September 1981

Indian Standard

METHODS OF TEST FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM MAN-MADE FIBRES

PART XII SAMPLING FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM POLYAMIDE

Sampling Methods Sectional Committee, TDC 33

Chairman	*Representing*
Dr (Miss) S. P. Vaswani	N. C. Corporation Private Ltd, Bombay
Members	
Shri P. K. Basu	Directorate General of Supplies & Disposals (Inspection Wing), New Delhi
Dr H. P. Bhattacharya	National Textile Corporation Ltd, New Delhi
Shri G. D. Chitnis	The Bombay Textile Research Association, Bombay
Dr Daroga Singh	Indian Agricultural Statistics Research Institute (ICAR), New Delhi
Shri S. P. Despande	The Ahmedabad Textile Industry's Research Association, Ahmadabad
Shri T. Narasimhan (*Alternate*)	
Shri S. S. Iyer	The Bombay Dyeing & Manufacturing Co Ltd, Bombay
Shri K. V. S. Sastry (*Alternate*)	
Shri P. Krishnaswami	Research & Development Organization (Ministry of Defence), New Delhi
Shri M. L. Behrani (*Alternate*)	
Shri S. D. Mathure	The Khatau Makanji Spg & Wvg Co Ltd, Bombay
Dr V. G. Munshi	Cotton Technological Research Laboratory (ICAR), Bombay
Shri G. S. Rajaraman (*Alternate*)	
Shri B. D. Pathak	Delhi Cloth & General Mills Co Ltd, Delhi
Shri A. K. Pokherna	Central Sheep and Wool Research Institute, Jaipur
Shri M. G. Rajan	Textile Committee (Govt of India, Ministry of Commerce), Bombay
Shri B. Wadhawan (*Alternate*)	
Shri T. V. Ratnam	The South India Textile Research Association, Coimbatore
Shri K. N. Seshan (*Alternate*)	

(*Continued on page* 2)

© *Copyright* 1981
INDIAN STANDARDS INSTITUTION
This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
REPRESENTATIVE	Aryodaya Spg & Wvg Co Ltd, Ahmadabad
SHRI S. M. SUNDARA RAJU	Indian Statistical Institute, Calcutta
SHRI N. SREENIVASAN (*Alternate*)	
SHRI Y. K. BHAT, Director (Stat)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI G. W. DATEY
Deputy Director (Stat), ISI

Sampling of Tyre Yarn, Tyre Cord and Tyre Cord Fabrics Subcommittee, TDC 33 : 1

Convener	
DR (MISS) S. P. VASWANI	N. C. Corporation Private Ltd, Bombay
Members	
SHRI P. P. APACHU	Shriram Rayons, Kota
SHRI V. K. SURI (*Alternate*)	
SHRI S. N. AYAKAD	J. K. Industries Ltd, Udaipur
SHRI N. GANESH (*Alternate*)	
SHRI M. C. BAJPAI	J. K. Synthetics Ltd, Bombay
SHRI L. K. P. GAJRIA (*Alternate*)	
SHRI S. V. JIGJINNI	The National Rayon Corporation Ltd, Bombay
SHRI D. S. NADKARNI (*Alternate*)	
SHRI A. GEORGE JOHN	Madras Rubber Factory Ltd, Madras
DR V. G. KAMATH	Nirlon Synthetic Fibres & Chemicals Ltd, Bombay
DR A. R. MUKHERJEE (*Alternate*)	
MRS A. KAPLASH	The Silk & Art Silk Mills Research Association, Bombay
SHRI S. KRISHNAMURTHY	Ceat Tyres of India Ltd, Bombay
SHRI K. S. LOGANATHAN	Dunlop India Limited, Calcutta
SHRI S. K. DE (*Alternate*)	
SHRI S. K. MUSTAFI	Modi Rubber Ltd, Modipuram
SHRI L. K. MATHUR (*Alternate*)	
DR A. S. NAIR	Premier Tyres Ltd, Kalamassery, Alwaye
SHRI K. NANDAKUMAR	Century Rayon, Bombay
SHRI L. S. MEHTA (*Alternate*)	
SHRI C. C. PEREIRA	Appollo Tyres Ltd, Perambra
SHRI CHARLES PINTO (*Alternate*)	
SHRI A. SANJEEVA RAO	Shriram Fibres Ltd, Madras
DR M. K. K. RAO (*Alternate*)	
SHRI P. G. SANT	Firestone Tyre & Rubber Co of India Pvt Ltd, Bombay
SHRI G. V. SARMA	Shri Ram Institute of Industrial Research, New Delhi
SHRI D. C. VERMA	Goodyear India Limited, Ballabgarh
SHRI P. SURI (*Alternate*)	

Indian Standard

METHODS OF TEST FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM MAN-MADE FIBRES

PART XII SAMPLING FOR TYRE YARNS, CORDS AND TYRE CORD FABRICS MADE FROM POLYAMIDE

0. FOREWORD

0.1 This Indian Standard (Part XII) was adopted by the Indian Standards Institution on 11 March 1981, after the draft finalized by the Sampling Methods Sectional Committee had been approved by the Textile Division Council.

0.2 This Indian Standard has been prepared at the suggestion of the subcommittee for Physical Methods of Test for Man-Made Fibre Textiles, TDC 1 : 20 and forms a necessary adjunct to other parts of IS : 4910.

0.2.1 The number of tests for determination of various characteristics is based on the statistical analysis of the extensive amount of data collected from various organizations to ascertain the inherent variability.

0.3 In reporting the result of a test or analysis, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard prescribes the methods for sampling of tyre yarns, tyre cords and tyre cord fabrics for determination of various physical characteristics, namely, linear density, breaking load, elongation at break, thickness (gauge), twist, heat shrinkage, heat shrinkage force and heat degradation. It gives the number of tests for determination of various characteristics with specified degree of accuracy. It also lays down the criteria for ascertaining the conformity to the specified requirements.

---

*Rules for rounding off numerical values (*revised*).

2. TERMINOLOGY

2.0 for the purpose of this standard, in addition to the terms defined in the Part VI of this standard, the following definitions shall apply.

2.1 Consignment — The quantity of tyre yarn, tyre cord or tyre cord fabrics delivered to a buyer against a despatch note.

2.2 Lot — All packages of tyre yarn or tyre cord or rolls of tyre cord fabrics of definite type and quality belonging to a consignment.

2.3 Limit of Error of Mean — The maximum difference between the sample mean and its true value (that would be obtained if all the units in the lot were tested) at a given probability level.

2.4 Mean — The sum of observations divided by the number of observations (*see* Appendix A).

2.5 Probability Level — A measure of probability associated with the sample size and limit of error of estimate. It expresses the probability that the difference between the estimate based on the sample of a particular size and its true value does not exceed the specified limit of error.

2.6 Range — The difference between the largest and the smallest observations in the sample (*see* Appendix A).

NOTE — In case the number of results in the sample is ten or more, they shall be divided into sub-groups of five test results each taking them consecutively in the same order as obtained. The range of each sub-group shall then be determined with a view to obtaining the mean range (*see* **2.7**).

2.7 Mean Range — The mean of a set of ranges calculated for sub-groups in the sample (*see* **2.5** and Appendix A).

2.8 Sample — Collection of packages of tyre yarn or tyre cords or tabbies from rolls of tyre cord fabrics selected for inspection from a lot.

2.9 Test Specimen — A specific portion of the yarn or cord selected from a package of yarn or cord or a tabby for performing a single test.

3. SAMPLING OF TYRE YARN OR TYRE CORD

3.1 Unless otherwise agreed to between the buyer and the seller, the number of packages of yarn or cord to be taken from a lot shall be five for lot size of 1 000 or less packages and ten otherwise.

3.2 The packages shall be selected at random from a lot.

3.2.1 When the sample is selected before the packages are packed in cases, the procedure of sampling shall be simple random sampling or systematic sampling as given in **3.1** or **3.3** respectively of IS : 4905-1968*.

3.2.2 When the packages are to be selected from the cases, the procedure of sampling shall be two-stage sampling given in **3.5** of IS : 4905-1968*.

3.3 Number of Tests

3.3.1 The minimum number of tests to be made for various characteristics shall depend upon the accuracy with which the characteristics are to be determined. Table 1 gives the number of tests necessary for the tyre yarn and tyre cord manufactured in the country for determination of linear density, breaking load, elongation at break, twist, heat shrinkage, heat shrinkage force and heat degradation for varying limits of error. The probability level for number of tests given in Table 1 varies between 95 and 98 percent.

TABLE 1 NUMBER OF TESTS

Characteristics	Limit of Error of Mean, Percent							
	0·8	1	1·5	2	3	4	5	7
Linear density	20	15	10	5	—	—	—	—
Breaking load	55	35	15	10	5	—	—	—
Elongation at break	—	—	—	60	30	15	10	5
Twist	55	35	15	10	5	—	—	—
Heat shrinkage	—	—	—	60	30	15	10	5
Heat shrinkage force	—	—	—	60	30	15	10	5
Heat Degradation	55	35	15	10	5	—	—	—

3.3.1.1 For knowing the limit of error of mean corresponding to a particular number of tests carried out for determination of a quality characteristic, Table 1 has been recast and given in Appendix B with number of tests appearing in first column, while the entries in subsequent columns give the corresponding limit of error of mean for various quality characteristics.

3.3.2 Unless otherwise agreed to between the buyer and the seller, 20 tests for linear density and twist, 50 tests for breaking load and elongation at break, 15 tests for heat shrinkage, heat shrinkage force and heat degradation and 10 tests for thickness (gauge) shall be made for all routine testing.

---

*Methods for random sampling.

3.3.2.1 As far as possible equal number of test specimens shall be drawn from each package drawn according to **3.1** and **3.2** The number of test specimens taken from each package shall be determined by dividing the number of tests to be conducted (*see* Table 1) by the number of packages selected (*see* **3.1**). If it comes out to be a fractional number, its maximum integral part (say i) shall be taken and i or (i+1) specimens shall be taken from each selected package so as to obtain the requisite number of test specimens. In case the number of tests is less than the number of packages selected, at least one test specimen may be drawn from each selected package. For example, when there are 1 500 packages in the lot, 10 packages are selected for testing. According to **3.3.2** for routine testing, the number of tests for breaking load is 50, while it is 10 for thickness (gauge). For drawing test specimens for breaking load test, 50 test specimens are to be taken from 10 packages. Thus, 5 (=50/10) test specimens are taken out from each of 10 packages. In the case of thickness (gauge), the number of packages drawn (10) is equal to the number of test specimens (10) required. Hence one test specimen is drawn from each of the 10 packages for inspection of thickness (gauge).

4. SAMPLING OF TYRE CORD FABRICS

4.1 Unless otherwise agreed to between the buyer and the seller, one tabby shall be taken for each creel load in a lot.

4.2 The number of cords taken out from a lot shall depend on the desired limit of error of mean for the determination of the characteristic.

4.2.1 Unless otherwise agreed to between the buyer and the seller, 10 tests for linear density and twist, 15 tests for breaking load, elongation at break, heat shrinkage, heat shrinkage force and heat degradation and five tests for thickness (gauge) shall be made.

4.3 For selection of cords from tabby, the tabby shall be divided into suitable number of parts by leaving approximately 10 cm from both ends and cutting the tabby across the weft yarn. From each part, as far as possible, equal number of cords shall be taken so as to get the requisite number of cords for testing as given in **4.2.1**.

4.3.1 The above procedure can be illustrated by the following example. Suppose the total width of the tabby is 150 cm. Cut out 10 cm from both ends. Divide the remaining 130 cm width of tabby in 5 equal parts of 26 cm each cutting it across the weft. For carrying out tests for determination of breaking load, 15 test specimens are required according to **4.2.1**. Thus, we select three cords from each part of the tabby for carrying out tests for breaking load.

5. CRITERIA FOR CONFORMITY

5.1 For ascertaining the conformity of the lot to the specification requirements, the procedure given in **5.1.1** and **5.1.2** shall be adopted. It may be noted that the criteria given in **5.1.1** and **5.1.2** are applicable when the specification limit refers to the individual test result and hence should not be applied in cases where specification limit is referring to average of the lot. The procedure for determining conformity of the lot is illustrated in examples given in **6.1**.

5.1.1 *One-Sided Specification Limit* — The lot shall be declared as conforming to the specification if:

a) the value of the expression ($\bar{x} - kR$) or ($\bar{x} - k\bar{R}$) is greater than or equal to L, when the lower specification limit, L is given:

OR

b) the value of the expression ($\bar{x} + kR$) or ($\bar{x} + k\bar{R}$) is less than or equal to U, when the upper specification limit, U, is given.

where the values of the factor k are given in Table 2 for different sample sizes, and U and L refer to the specification limits for individual test results.

5.1.2 *For Two-Sided Specification Limits* — The lot shall be declared as conforming to the specification if:

a) the value of the expression $R/(U - L)$ or $\bar{R}/(U - L) \leqslant B$,
b) the value of the expression ($\bar{x} + kR$) or ($\bar{x} + k\bar{R}$) $\leqslant U$, and
c) the value of the expression ($\bar{x} - kR$) or ($\bar{x} - k\bar{R}$) $\geqslant L$

where the values of the factors B and k are given in Table 2 for different sample sizes, and U and L refer to the specification limits for individual test results.

TABLE 2 VALUES OF THE FACTORS

(*Clauses* 5.1.1 *and* 5.1.2)

SAMPLE SIZE (n)	(k)	B
5	0·3	1·0
10	0·4	0·9
15 and above	0·5	0·8

6. ILLUSTRATIVE EXAMPLE

6.1 When Specification Limit Refers to Individual Test Result — A consignment of polyamide tyre yarn of 1260 D designation containing 4 000 packages was delivered to a buyer. The buyer desires to ascertain the conformity of the lot to the requirement of linear density of 1 260 denier with tolerance of ± 3 percent.

The number of packages to be chosen according to **3.1** from the lot of 4 000 packages is 10 and the number of tests to be made for linear density according to **3.3.2** is 20.

Suppose the packages are packed in cases. Out of the cases in the lot, 10 cases should be selected at random and from each case, two packages shall be drawn for inspection. One test specimen of desired length shall be taken out and tested from each of the packages selected. The observations obtained in denier are as follows:

1 280	1 296	1 281	1 285
1 282	1 282	1 281	1 282
1 296	1 283	1 283	1 280
1 274	1 266	1 298	1 267
1 281	1 282	1 283	1 290

The mean of the test results shall be calculated as follows:

$$\text{The mean linear density } (\bar{x}) = 1\,280 + 1\,282 + \ldots\ldots 1\,267 + 1\,290$$

$$= \frac{2\,5652}{20}$$

$$= 1\,282{\cdot}6$$

The mean range R of test results calculated by taking the ranges of four groups each consisting of five consecutive test results shall be:

$$\bar{R} = \frac{22 + 30 + 17 + 23}{4}$$

$$= \frac{92}{4}$$

$$= 23{\cdot}0$$

Applying the criteria given in **5.1.2**:

We have:

a) $\dfrac{R}{U - L} = \dfrac{23{\cdot}0}{75{\cdot}6} = 0{\cdot}3 \leqslant 0{\cdot}8 \; (B)$

b) $\bar{x} + k\bar{R} = 1\,282{\cdot}6 + 0{\cdot}5 \times 23{\cdot}0$
$= 1\,282{\cdot}6 + 11{\cdot}5$
$= 1\,294{\cdot}1$
$< 1\,297{\cdot}8\ (U)$

c) $\bar{x} - k\bar{R} = 1\,282{\cdot}6 - 0{\cdot}5 \times 23{\cdot}0$
$= 1\,282{\cdot}6 - 11{\cdot}5$
$= 1\,271{\cdot}1$
$> 1\,222{\cdot}2\ (L)$

where the values of B and k are given in Table 3.

Since the criteria given under **5.1.2** are satisfied, we conclude that the lot meets the specification requirements.

NOTE — In case the specification limit refers to the average of the lot, the concepts of AQL, LQL, producer's risk and consumer's risk are not applicable as such. However, the limit of error of mean given in Table 1 can be made use of for determining the conformity of the lot, as illustrated in the example given below (*see* **6.2**).

6.2 When Specification Limit Refers to Average of the Lot — A consignment of 1 260 D × 2 Nylon 6 tyre cord fabrics containing a creel load was delivered to a buyer who desires to ascertain the conformity of the lot to requirement of average breaking strength of minimum 21 kg.

The number of tabbies to be selected according to **4.1** from the lot of a creel load is one and the number of tests to be made for breaking strength according to **4.2** is 15.

Following the procedure given in **4.3**, three cords are drawn from each of five parts of the tabby to get a total of 15 cords. The observations obtained are as follows:

21·9	22·5	22·6
21·5	22·7	21·6
22·7	22·8	22·2
22·0	22·9	22·4
22·3	22·2	21·8

The mean of the test results shall be calculated as follows:

$$\text{The mean breaking strength, kg,} = \frac{21{\cdot}9 + 21{\cdot}5 + \ldots + 22{\cdot}4 + 21{\cdot}8}{15}$$

$$= \frac{333{\cdot}3}{15}$$

$$= 22{\cdot}2$$

From Table 1, we note that 15 tests correspond to 1·5 percent error of determination of mean. Thus, the observed average minus the error of determination, i. e., 21·9 (= 22·2 — 0·3) is greater than the minimum specified value of 21 kg and hence the lot is accepted.

APPENDIX A

(*Clauses* 2.4, 2.6 *and* 2.7)

GLOSSARY OF SYMBOLS

$\bar{x}$	Mean: if $x_1, x_2 \ldots\ldots x_n$ are the n measurements of the items in a sample, then $\bar{x} = \dfrac{x_1 + x_2 \ldots\ldots + x_n}{n}$
R	Range: if $x_1, x_2 \ldots\ldots x_n$ are the n measurements of items in a sample arranged in the ascending order of magnitude, then $R = x_n - x_1$
$\bar{R}$	Mean range: if $R_1, R_2 \ldots\ldots R_m$ are the range of m subgroups of five observations each (so that the sample size $n = 5m$), then $\bar{R} = \dfrac{R_1 + R_2 \ldots\ldots + R_m}{m}$
k	Co-efficient of R or $\bar{R}$ for the criteria for conformity.
B	Maximum value for the expression $\dfrac{R}{U - L}$ or $\dfrac{\bar{R}}{U - L}$ in criteria for conformity for two-sided specification limits.
U	Upper specification limit.
L	Lower specification limit.
$\leqslant$	Less than or equal to.
$\geqslant$	Greater than or equal to.

APPENDIX B

(*Clause* 3.3.1.1)

LIMIT OF ERROR OF MEAN CORRESPONDING TO DIFFERENT NUMBER OF TESTS FOR VARIOUS QUALITY CHARACTERISTICS

B-1. Table 3 gives the limit of error of mean corresponding to different number of tests carried out for various quality characteristics. The probability level for the limit of error of mean given in Table 3 varies between 95 and 98 percent.

TABLE 3 LIMIT OF ERROR OF MEAN

(*Clauses* 3.3.1.1 *and* B-1)

Number of Tests	Characteristics		
	Linear Density	Breaking Load, Twist and Heat Degradation	Elongation at Break, Heat Shrinkage and Heat Shrinkage Force
(1)	(2)	(3)	(4)
5	2	3	7
10	1·5	2	5
15	1	1·5	4
20	0·8	—	—
30	—	—	3
35	—	1	—
55	—	0·8	—
60	—	—	2

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

INDIAN STANDARDS

Over 10 000 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Textile Group fall under the following categories:

- Aeronautical textiles
- Chemical test methods
- Colour fastness of textile materials
- Cotton fabrics — handloom, khadi, and mill-made
- Dyestuffs
- Grading of fibres and yarns
- Grading of raw silk
- Hosiery
- Jute — bags and fabrics
- Jute mill accessories
- Narrow fabrics
- National flag of India
- Nylon fabrics
- Packaging code
- Physical test methods
- Rayon fabrics
- Rayon fabrics, handloom
- Ropes and cordages
- Sampling of textiles, methods for
- Silk fabrics — handloom and khadi
- Sizing and finishing materials
- Spinning machinery components
- Terminology
- Textile floor coverings
- Textile materials for fishing
- Textile mill accessories (other than jute mills)
- Twines
- Weaving machinery components
- Wool fabrics — handloom, khadi, and mill-made
- Yarn and similar structures
- Unclassified

OTHER PUBLICATIONS

ISI Bulletin (Published Every Month)	
Single Copy	Rs 4·00
Annual Subscription	Rs 36·00
Standards : Monthly Additions	
Single Copy	Re 0·30
Annual Subscription	Rs 3·00
Annual Reports (from 1248-49 Onwards)	Rs 2·00 to 7·00
ISI Handbook, 1980	Rs 100·00

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31 **Telegrams : Manaksanstha**

Regional Offices :

			Telephone
Western	: Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern	: 5 Chowringhee Approach	CALCUTTA 700072	27 50 90
Southern	: C. I. T. Campus, Adyar	MADRAS 600020	41 24 42
Northern	: B69, Phase VII	S.A.S. NAGAR (MOHALI) 160051	—

Branch Offices:

'Pushpak' Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	2 76 49
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
5-8-56C L. N. Gupta Marg	HYDERABAD 500001	22 10 83
R 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	8 12 72
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	3227

Printed at Printograph, New Delhi, India